THE SOLVATION DYNAMICS OF $Ni^+(H_2O)_n$ CLUSTERS STUDIED BY INFRARED PHOTODISSOCIATION SPECTROSCOPY

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Infrared photodissociation spectra of mass-selected $Ni^+(H_2O)_n$ clusters are reported for n=3-25 complexes. The clusters fragment by the loss of one or more intact water molecules and their spectra show distinct bands in the region of the symmetric and asymmetric stretches of water (3657 cm^-1, 3756 cm^-1). A broad feature appears to the red of the O-H region due to hydrogen bonding at a specific cluster size (n=4), indicating the onset of solvation. At larger cluster sizes, the red-shifted feature becomes more dominant and the symmetric O-H stretch loses its intensity until it is not observed at all. The data indicate that as cluster size increases, the water molecules are included in the hydrogen-bonded network and beginning with $Ni^+(H_2O)_10$, the complexes resemble water clusters contaminated with a single metal atom.